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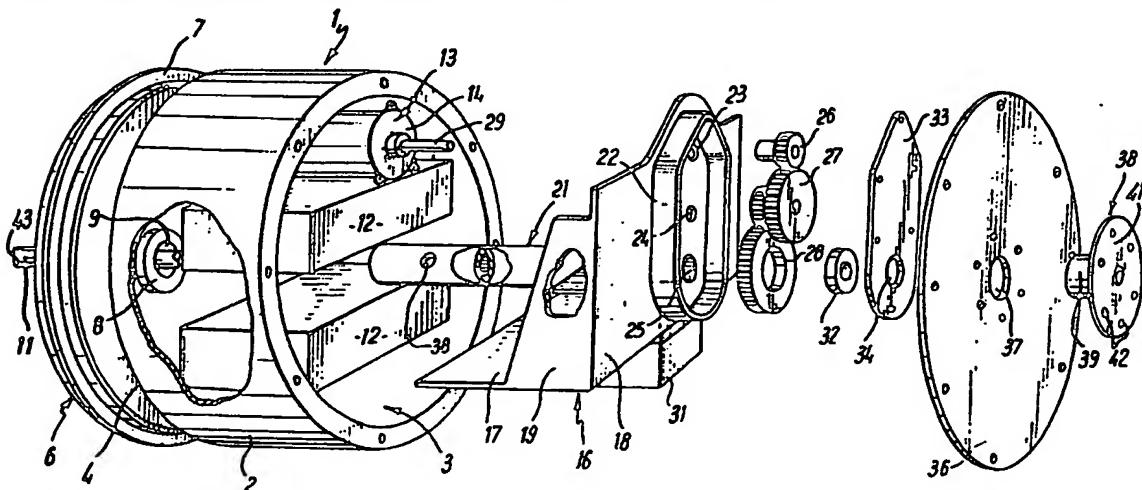
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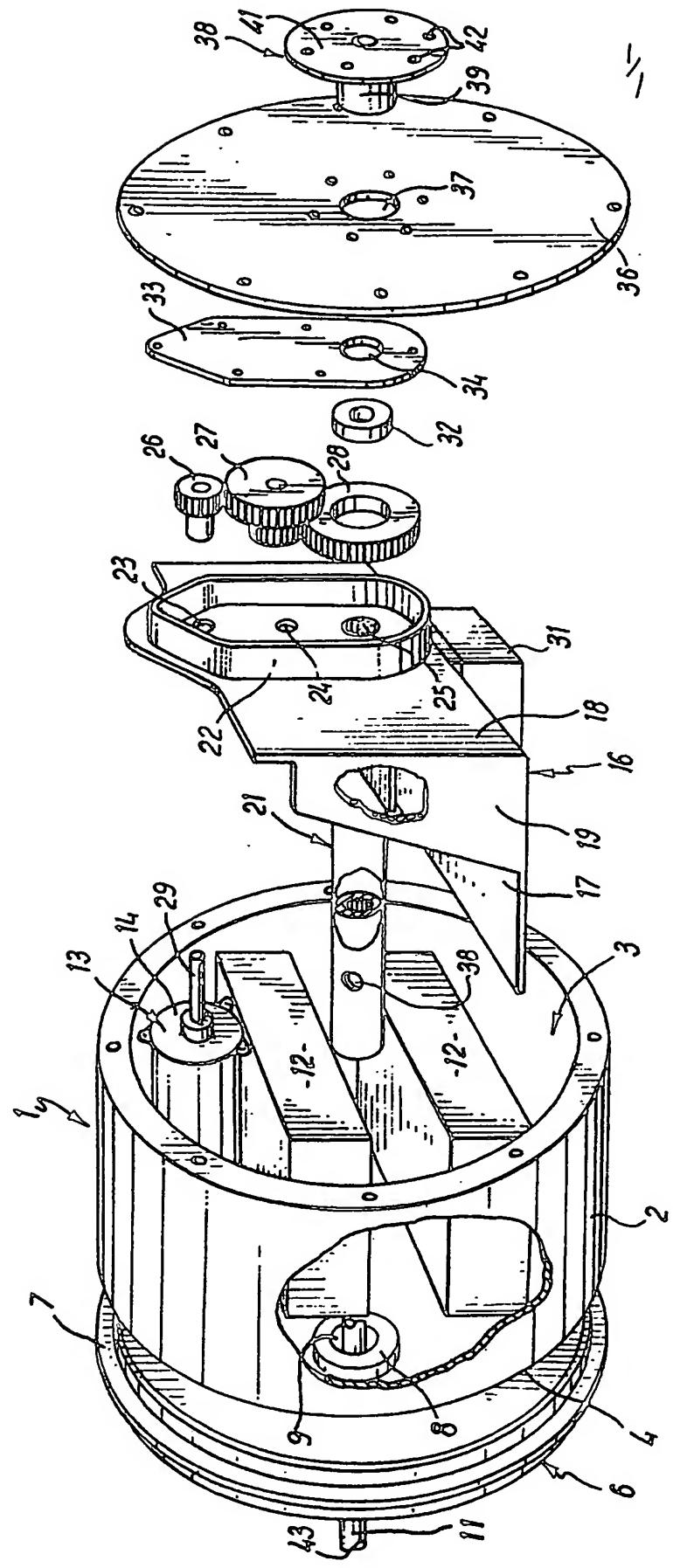
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(54) Wheel with self-contained drive assembly, eg. for carts or golf trolleys

(57) A drive assembly for a wheel (1) or wheels is contained wholly within one of such wheels. The drive assembly may comprise an internal power source, e.g. batteries (12), which drives the wheel axle (6) by way of a motor (13) and gear arrangement (26, 27, 28). The assembly is mounted within the wheel (1) by way of a suitably configured housing bracket (16) whereby the assembly is held stationary relative to the axle (6) whilst the wheel (1) rotates thereabout. A roller-bearing clutch (32) may be located inside the lowest gear (28), with the axle (11) passing therethrough. A speed controller (31) may be mounted on the bracket (16) for connection to a remote user-operated control.



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DRIVE ASSEMBLY

This invention relates to a drive assembly for a wheel or wheels particularly for use in powered carts, for example golf trolleys, carts etc.

5 Commonly wheel drive assemblies for such trolleys and the like are provided externally of the wheels and thus the wheels are driven through external transmission units, gear boxes and speed controllers etc. These types of arrangement are generally bulky and can therefore be  
10 difficult to transport, requiring dismantling of the assembly beforehand.

It is an object of the present invention to provide a drive assembly for a wheel or wheels which is compact in size and is able to be fitted (and removed) with the  
15 wheel with relative ease.

According to the present invention therefore there is provided a drive assembly for a wheel or wheels wherein said drive assembly is provided substantially wholly within one of said wheels.

20 With this arrangement it is possible to provide a compact and simple drive for a wheel.

Preferably said drive assembly includes an integral power source and said power source may comprise one or more battery cells. The drive assembly may further  
25 comprise a motor adapted to provide the drive for said wheel or wheels. Said motor may drive said wheel or

wheels via a transmission means, which transmission means may comprise multiple intermeshed gears.

The drive assembly may further comprise a housing bracket means, which housing means is adapted to locate 5 said transmission means. Thus said gears may be located in a recess in said housing. Said housing means may further act to locate said battery cells and said motor in a fixed disposition relative to each other and said transmission means.

10 A clutch means may be associated with said transmission means and said clutch may be of the roller bearing type whereby rotation of a wheel with which the drive assembly is used is permitted in one direction only.

15 A speed control means may be included in said drive assembly, which control means is operable directly to control the speed of said motor. Said control means may be connected to a remote user operable control and in this case the connection may be effected by a cable or 20 rod or the like. In one embodiment a remote potentiometer arrangement is linked to the speed control means via a cable thereby allowing a user to conveniently alter the speed as desired or as appropriate.

Preferably the drive assembly is mounted within a 25 wheel in such a manner that the wheel is able to rotate about an axis thereof whilst said assembly remains

stationary relative to said axis.

The control means may be fixed onto said housing bracket means.

Whilst the drive assembly is described in relation 5 to a wheel it is of course to be appreciated that the drive assembly can be used to drive any suitable arrangement.

It is envisaged that the drive assembly of the invention will find particular application in the 10 powering of golf trolleys or carts or similar, however the invention is not intended to be restricted to these uses.

The invention will now be described further by way of example only and with reference to the accompanying 15 drawing, the single figure of which shows an exploded view of one form of drive assembly according to the invention.

Referring now to the drawing, there is shown an exploded view of a drive assembly for a wheel 1 which can 20 be mounted within the wheel and can be completely enclosed thereby.

The wheel 1 comprises a generally hollow cylindrical tyre 2 which has a continuous throughbore 3 thereto. The throughbore 3 has a diameter substantially equal to the 25 diameter of the entire wheel 1. One end 4 of the throughbore 3 of the tyre 2 is closed off by a disc-

shaped member 6 having a circumferential flange 7 extending around the entire periphery thereof. The disc member 6 is secured to the end 4 of the wheel 1 by way of screws or other fixing devices (not shown) extending 5 through aligned apertures (not shown) in the flange 7 and end 4.

A circular bearing 8 having a central throughbore 9 is fixed to the disc member 6, the throughbore 9 communicating with an aperture (not shown) in the centre 10 of the disc member 6 thereby defining a continuous bore therethrough.

The wheel axle 11 extends generally along the axis of the wheel 1 through the throughbore 9 in bearing 8 and the aperture in the disc member 6.

15 An internal power source 12 is provided in the form of two battery cells disposed one on each side of the wheel axle 11 and hence the axis of the wheel 1. The battery cells 12 provide the power to drive a conventional d.c. motor 13 which is disposed above the 20 battery cells 12 and is secured at one end 14 to a housing bracket 16.

The housing bracket 16 comprises a generally L-shaped member having longitudinal and transverse planar sections 17, 18 and tapered side sections 19. A hollow 25 cylindrical tubular sleeve 21 is formed integrally with the bracket 16 and projects perpendicularly from the

surface of the transverse section 18 and extends generally parallel to the longitudinal section 17. The sleeve 21 projects beyond the longitudinal section 17. The diameter of the sleeve 21 is such that it can be 5 inserted into the bore through the disc member 6 and the bearing 8 during assembly such that an interference fit is achieved with the bearing 8.

An upstanding wall 22 is provided on a back surface of the transverse section 18 of the bracket 16 defining a 10 recess inside the wall 22. The recess has an axis of symmetry, which in the drawing is substantially vertical, along which are provided, spaced from each other, three apertures 23, 24, 25. Each aperture 23, 24, 25 serves to locate a gear 26, 27, 28, each gear 26, 27, 28 being of 15 conventional form and preferably constructed from nylon thereby requiring no lubrication. The lower of the apertures 25 communicates with the interior of the tubular sleeve 21, this interior being adapted by the provision of upstanding projections extending parallel to 20 the axis thereof for a purpose to be described hereinafter.

The upper of the apertures 23 is adapted to receive the drive shaft 29 of the motor 13 therethrough into engagement with an upper one 26 of the gears.

25 A speed controller 31 of conventional form is mounted on the longitudinal section 17 of the housing

bracket 16. The speed controller 31 acts to directly set the speed of the drive motor 13 in accordance with a users wishes.

A roller bearing clutch 32 is housed in the lower 28 5 of the gears and is configured such that the axle 11 can pass through. The gears 26, 27, 28 are retained in position in the recess by a gear cover 33 which comprises a suitably configured plate which is adapted to be secured over the recess in any convenient manner. The 10 plate 33 has an aperture 34 in a lower part thereof through which the axle 11 can pass.

A further disc-shaped member 36 is arranged to close off the opposite side of the wheel 1 in a similar manner to that described in relation to the first disc-shaped 15 member 6. The further member 36 has an aperture 37 in the centre through which the axle 11 can extend by a very small proportion of its length. A small drive member 38 having a tubular locating member 39 projecting from the centre thereof is used to connect the axle 11 to the 20 wheel 1. The end of the axle 11 is inserted into the locating member 39 of the drive member 38 and the drive member 38 is shrunk into attachment therewith. It will of course be appreciated that at least the locating member 39 and preferably the whole drive member 38 is 25 constructed from thermally shrinkable material such as thermoplastics or steel or the like. An end securing

portion 41 of the drive member 38 is adapted by the provision of fixing holes 42 to be secured to the further disc-shaped member 36 by way of screws or other fixing devices.

5 In use a free end 43 of the axle 11 is used to secure the wheel 1, with drive assembly in place, to a wheel (not shown) on the opposite side of the trolley and the housing bracket 16 is used to secure the assembly to the trolley. The drive assembly can be operated by  
10 either a control switch (not shown) provided on the wheel 1 itself or alternatively the speed controller 31 can be connected by way of a cable to a control switch mounted in a more accessible place on the trolley, for example the handle or similar. Such a cable can be led between  
15 the sleeve 21 and the axle 11 and can emerge through an aperture 38 in the sleeve 21 and thus can be conveniently located without interfering with the operation of the assembly. In the latter case the control switch can comprise a simple potentiometer, and when activated by  
20 operation of the control switch, the motor 13 drives the axle 11 via the gears 26, 27, 28. Due to the provision of the projections in the sleeve 21 of the housing bracket 16, when the axle 11 rotates the disc member 6 and tyre 2 will rotate therewith whilst the housing  
25 bracket 16 will remain stationary. This is advantageous since it prevents any unnecessary movement of the parts

of the drive assembly thereby minimising the possibilities for disruption of the operation of the assembly by such movement. Furthermore, the roller bearing clutch 33 mounted in the lower gear 28 acts to 5 permit free rotation of the axle 11 and tyre 2 in one direction only.

The speed of rotation of the axle 11 and thus the speed of movement of the trolley can be conveniently set via the control switch (not shown).

10 With this arrangement it is possible to provide a small and efficient drive assembly for a powered trolley which is capable of being readily and conveniently removed.

It is of course to be understood that the invention 15 is not intended to be restricted to the details of the above embodiment which are described by way of example only.

CLAIMS

1. A drive assembly for a wheel or wheels wherein said drive assembly is provided substantially wholly within one of said wheels.
- 5 2. A drive assembly according to claim 1, wherein said assembly comprises an integral power source.
3. A drive assembly according to claim 2, wherein said power source comprises one or more battery cells.
4. A drive assembly according to any one of claims 1 to 10 3, wherein said assembly comprises a motor adapted to provide the drive for said wheel or wheels.
5. A drive assembly according to claim 4, wherein said motor drives said wheel or wheels via transmission means.
6. A drive assembly according to claim 5, wherein said 15 transmission means comprises multiple intermeshed gears.
7. A drive assembly according to claim 5 or claim 6, wherein said assembly further comprises a housing bracket means adapted to locate said transmission means.
8. A drive assembly according to claim 7, wherein said 20 housing bracket is provided with a recess in which said transmission means locate.
9. A drive assembly according to claim 7 or claim 8 when dependent on claim 2 or claim 4, wherein said housing bracket is further adapted to locate said power 25 source and said motor in such a manner as to maintain the same in a fixed disposition relative to each other and

said transmission means.

10. A drive assembly according to any one of claims 5 to 9, wherein a clutch means is provided associated with said transmission means.

5 11. A drive assembly according to claim 10, wherein said clutch means is of a roller bearing type.

12. A drive assembly according to any one of claims 4 to 11, wherein said drive assembly further includes a speed control means operable to control the speed of said 10 motor.

13. A drive assembly according to claim 12, wherein said speed control means is connected to a remote user operable control by way of a cable.

14. A drive assembly according to claim 13, wherein said 15 remote user control comprises a potentiometer arrangement.

15. A drive assembly according to any one of claims 12 to 14 when dependent on claim 7, wherein said speed control means is fixed onto said housing means.

20 16. A drive assembly according to any one of claims 1 to 15, wherein said drive assembly is mounted within a wheel in such a manner that the wheel rotates about an axis thereof whilst the motor remains stationary relative to said axis.

25 17. A drive assembly substantially as hereinbefore described with reference to and as illustrated in the

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accompanying drawing.

18. A vehicle having a wheel incorporating a drive assembly according to any preceding claim.